



# SEQUENCE LISTING

Appendix A

<110> KIM, Jong-Bae

<120> CRUDE EXTRACT FROM Viscum album coloratum, AND PROTEINS  
AND LECTINS ISOLATED THEREFROM

<130> Korean Mistletoe Lectin

<140> 09/627,165

<141> 2000-07-27

<160> 80

<210> 1

<211> 762

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

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atcacgcttc tccgagatta tgtctcaagc ggaagctttt ccaatgagat accactcttg 120

cgctcagtcta cgatccccgt ctccgatgcg caaagatttg ttttggtgga actcaccaat 180

cagggggggag actcgatcac ggccgccatc gacgttacta acctgtacgt ggtggcttac 240

caagcaggcg accaatccta cttttgctgc gacgcaccag acggcgcgga aaggcatctc 300

ttaccggca ccaccagatc ctccctccca ttaccggaa gctacacaga tctggagcga 360

ttcgccggtc atagggacca gatccctctg gtagagagg aactcattca atccgtctcg 420

gcccttcgtt ttccgggcag caacactcgt gcccaagctc gtcccttat catcctcatt 480

cagatgatct ccgaggccgc cagattcaat cccatcttat ggagggetcg ccaatacatt 540

agcagtgggg ggtcatttct gccagacacg tacattctcc agctggagac gagttggggg 600

caacaatcca cgcaagtcca gcaactcgacg gatggcggtt ttaataaccc aattcggttg 660

actatatcca ctggtgtctt cgtgacgttg agcaatgttc gcgacgtgat cgccagctta 720

gcgatcatgt tgtttgtatg cgaggaccgg ccattcttct ct 762

<210> 2

<211> 254

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 2

Tyr Glu Arg Leu Arg Leu Arg Val Thr His Gln Thr Thr Gly Asp Glu  
1 5 10 15

Tyr Phe Arg Phe Ile Thr Leu Leu Arg Asp Tyr Val Ser Ser Gly Ser  
20 25 30

Phe Ser Asn Glu Ile Pro Leu Leu Arg Gln Ser Thr Ile Pro Val Ser  
35 40 45

Asp Ala Gln Arg Phe Val Leu Val Glu Leu Thr Asn Gln Gly Gly Asp  
50 55 60

Ser Ile Thr Ala Ala Ile Asp Val Thr Asn Leu Tyr Val Val Ala Tyr  
65 70 75 80

Gln Ala Gly Asp Gln Ser Tyr Phe Leu Arg Asp Ala Pro Asp Gly Ala  
85 90 95

Glu Arg His Leu Phe Thr Gly Thr Thr Arg Ser Ser Leu Pro Phe Thr  
100 105 110

Gly Ser Tyr Thr Asp Leu Glu Arg Phe Ala Gly His Arg Asp Gln Ile  
115 120 125

Pro Leu Gly Arg Glu Glu Leu Ile Gln Ser Val Ser Ala Leu Arg Phe  
130 135 140

Pro Gly Ser Asn Thr Arg Ala Gln Ala Arg Ser Phe Ile Ile Leu Ile  
145 150 155 160

Gln Met Ile Ser Glu Ala Ala Arg Phe Asn Pro Ile Leu Trp Arg Ala  
165 170 175

Arg Gln Tyr Ile Ser Ser Gly Gly Ser Phe Leu Pro Asp Thr Tyr Ile  
180 185 190

Leu Gln Leu Glu Thr Ser Trp Gly Gln Gln Ser Thr Gln Val Gln His  
195 200 205

Ser Thr Asp Gly Val Phe Asn Asn Pro Ile Arg Leu Thr Ile Ser Thr  
210 215 220

Gly Val Phe Val Thr Leu Ser Asn Val Arg Asp Val Ile Ala Ser Leu  
225 230 235 240

Ala Ile Met Leu Phe Val Cys Glu Asp Arg Pro Ser Ser Ser  
245 250

<210> 3

<211> 762

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 3

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atcacgttc tccgagatca tgtctcaagc ggaagcttgt ccaatcaa accactcttg 120

cggcagtcta ctgtccccgt ctcgatagc cagagatttg tgttggtgga actcagcaat 180

cagggggggag actcgatcac ggccgccatc gacgttacca atctgtacgt ggtggcttac 240

caagcaggca accaatccta cttttgcgc gacgcacctc gcggcgcgga aacgtatctc 300

ttaccggca ccaccgatc ctctctccca ttcaacggaa gctaccctga tctggagcga 360

tacgccggac atagggacca gatccctctc ggtatagacc aactattca atccgtctcg 420

gcccttcgtt ttccgggcag caacactcgt gcccaagctc gttcctttat catcctcatt 480  
 cagatgatct ccgaggccgc cagattcaat cccatcttat ggagggctcg ccaatacatt 540  
 agcagtgggg ggtcatttct gccagacacg tacattctcc agctggagac gagttggggg 600  
 caacaatcca cgcaagtcca gcactcgacg gatggcggtt ttaataaccc aattcggttg 660  
 actatatcca ctggtgtctt cgtgacgttg agcaatgttc gcgacgtgat cgccagcyta 720  
 gcgatcatgt tgtttgatg cgaggaccgg ccattctcct ct 762

<210> 4  
 <211> 254  
 <212> PRT  
 <213> Viscum album coloratum

<220>

<221> misc\_feature  
 <222> 240  
 <223> Xaa = any amino acid

<400> 4

Tyr Glu Arg Leu Arg Leu Arg Val Thr His Gln Thr Thr Gly Asp Gln  
 1 5 10 15

Tyr Phe Lys Phe Ile Thr Leu Leu Arg Asp His Val Ser Ser Gly Ser  
 20 25 30

Leu Ser Asn Gln Ile Pro Leu Leu Arg Gln Ser Thr Val Pro Val Ser  
 35 40 45

Asp Thr Gln Arg Phe Val Leu Val Glu Leu Ser Asn Gln Gly Gly Asp  
 50 55 60

Ser Ile Thr Ala Ala Ile Asp Val Thr Asn Leu Tyr Val Val Ala Tyr  
 65 70 75 80

Gln Ala Gly Asn Gln Ser Tyr Phe Leu Arg Asp Ala Pro Arg Gly Ala  
 85 90 95

Glu Thr Tyr Leu Phe Thr Gly Thr Thr Arg Ser Ser Leu Pro Phe Asn

C10  
 conf.

100                      105                      110  
 Gly Ser Tyr Pro Asp Leu Glu Arg Tyr Ala Gly His Arg Asp Gln Ile  
 115                      120                      125  
 Pro Leu Gly Ile Asp Gln Leu Ile Gln Ser Val Ser Ala Leu Arg Phe  
 130                      135                      140  
 Pro Gly Ser Asn Thr Arg Ala Gln Ala Arg Ser Phe Ile Ile Leu Ile  
 145                      150                      155                      160  
 Gln Met Ile Ser Glu Ala Ala Arg Phe Asn Pro Ile Leu Trp Arg Ala  
 165                      170                      175  
 Arg Gln Tyr Ile Ser Ser Gly Gly Ser Phe Leu Pro Asp Thr Tyr Ile  
 180                      185                      190  
 Leu Gln Leu Glu Thr Ser Trp Gly Gln Gln Ser Thr Gln Val Gln His  
 195                      200                      205  
 Ser Thr Asp Gly Val Phe Asn Asn Pro Ile Arg Leu Thr Ile Ser Thr  
 210                      215                      220  
 Gly Val Phe Val Thr Leu Ser Asn Val Arg Asp Val Ile Ala Ser Xaa  
 225                      230                      235                      240  
 Ala Ile Met Leu Phe Val Cys Glu Asp Arg Pro Ser Ser Ser  
 245                      250

<210> 5

<211> 768

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 5

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atcaagcttc tccgagactc tgtctcaagc ggaagctttt ccaatgacat accgctcctg 120

cctccgctcaa tcccggcttc ctctgctcag agatttgtgt tgggtgaact cacaatcag 180

ttgggaaagt gggaagactc gatcacggcc gccatcgacg ttaccaatct gtacgtggtg 240  
 gcttaccaag caggcgacca atcctacttt ttgcgcgacg caccagacgg cgcggaagg 300  
 catctcttca ccggcaccac cagatcctct ctctcttca acggaagcta cgtgatctg 360  
 gagcggtacg ccggacatag ggaccggatc cctctgggta gagagccact catacgatcc 420  
 gtctcggcgc ttgattatcc cggcggcagc acgcgcgcc aagccagttc cattattatc 480  
 gtcatcaga tgatctcca ggcgccaga ttcaatccca tcctatggag ggctcgcaa 540  
 tacattaaca gtggggtgtc atatctcca gacgtgtaca tgctggagct ggaggcgagt 600  
 tggggccaac aatcgacca agtcagcag tcgaccgatg gcgttttaa taaccaatt 660  
 cggttgggta tatccaccgg caacttcgtg tggttgagca atgttcgca cgtgatgcc 720  
 agcttgggga tcatggtgtt tgtatgcagg gaccggtcat ctccct 768

<210> 6

<211> 256

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 6

Tyr Glu Arg Leu Arg Leu Arg Val Thr His Gln Thr Thr Gly Asp Glu  
 1 5 10 15

Tyr Phe Arg Phe Ile Lys Leu Leu Arg Asp Ser Val Ser Ser Gly Ser  
 20 25 30

Phe Ser Asn Asp Ile Pro Leu Leu Pro Pro Ser Ile Pro Val Ser Ser  
 35 40 45

Ala Gln Arg Phe Val Leu Val Glu Leu Thr Asn Gln Leu Gly Lys Trp  
 50 55 60

Glu Asp Ser Ile Thr Ala Ala Ile Asp Val Thr Asn Leu Tyr Val Val  
65 70 75 80

Ala Tyr Gln Ala Gly Asp Gln Ser Tyr Phe Leu Arg Asp Ala Pro Asp  
85 90 95

Gly Ala Glu Arg His Leu Phe Thr Gly Thr Thr Arg Ser Ser Leu Pro  
100 105 110

Phe Asn Gly Ser Tyr Ala Asp Leu Glu Arg Tyr Ala Gly His Arg Asp  
115 120 125

Arg Ile Pro Leu Gly Arg Glu Pro Leu Ile Arg Ser Val Ser Ala Leu  
130 135 140

Asp Tyr Pro Gly Gly Ser Thr Arg Ala Gln Ala Ser Ser Ile Ile Ile  
145 150 155 160

Val Ile Gln Met Ile Ser Glu Ala Ala Arg Phe Asn Pro Ile Leu Trp  
165 170 175

Arg Ala Arg Gln Tyr Ile Asn Ser Gly Val Ser Tyr Leu Pro Asp Val  
180 185 190

Tyr Met Leu Glu Leu Glu Ala Ser Trp Gly Gln Gln Ser Thr Gln Val  
195 200 205

Gln Gln Ser Thr Asp Gly Val Phe Asn Asn Pro Ile Arg Leu Gly Ile  
210 215 220

Ser Thr Gly Asn Phe Val Trp Leu Ser Asn Val Arg Asp Val Ile Ala  
225 230 235 240

Ser Leu Gly Ile Met Val Phe Val Cys Arg Asp Arg Ser Ser Ser Pro  
245 250 255

<210> 7

<211> 797

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 7

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gtctcgacgt cccagagggc gattaccacg atggaagtcg gatacagttg tggccctgca 120  
agtccaactc cgatcagaat cagctgtgga cgatcagaag ggatggaacc attcgatcta 180  
atggaagggtg cttgacgacc tatgggtata ctgcgggcag ctatataatg atctacgact 240  
gtaatagagg ggggtgggac cttactactt ggcagataag gggcaatgga atcatcctta 300  
atccaagatc catgatgttg atcggaacac catccgggag ccgcggaacc cgtggcacta 360  
cttttactct gcaaacactg ggttactcat taggacaggg ctggcttgcc agcaatgata 420  
ccgctcctcg cgaggttaacc atatatggtt tccggatca ttgcatggaa actagtggag 480  
ggaaagtgtg ggttgggact tgtgtgagtg gcaagcagaa ccaaagatgg gctttgtacg 540  
gggatgggtc cattcgcccg aaaccttacc aagaccaatg cctcacctct cagggagact 600  
ccgtagatc cgtaatcaat ttatttagct gcaccgtgg atcgccaagg caacgatggg 660  
tattaccaaa taaaggggcc atttgaatt taaagaatag gttggccatg gatgtggcgg 720  
aatcaaatcc aagcctccgc cgaataatca tcttttcagt cactggaaat ccaaatcaaa 780  
tgtggcttcc cgtgccca 797

<210> 8

<211> 266

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 8

Asp Asp Val Thr Cys Thr Thr Ser Glu Pro Thr Val Arg Phe Val Gly  
1 5 10 15



Arg Asn Gly Leu Cys Leu Asp Val Pro Glu Gly Asp Tyr His Asp Gly  
20 25 30

Ser Arg Ile Gln Leu Trp Pro Cys Lys Ser Asn Ser Asp Gln Asn Gln  
35 40 45

Leu Trp Thr Ile Arg Arg Asp Gly Thr Ile Arg Ser Asn Gly Arg Cys  
50 55 60

Leu Thr Thr Tyr Gly Tyr Thr Ala Gly Ser Tyr Ile Met Ile Tyr Asp  
65 70 75 80

Cys Asn Arg Gly Gly Trp Asp Leu Thr Thr Trp Gln Ile Arg Gly Asn  
85 90 95

Gly Ile Ile Leu Asn Pro Arg Ser Met Met Val Ile Gly Thr Pro Ser  
100 105 110

Gly Ser Arg Gly Thr Arg Gly Thr Thr Phe Thr Leu Gln Thr Leu Gly  
115 120 125

Tyr Ser Leu Gly Gln Gly Trp Leu Ala Ser Asn Asp Thr Ala Pro Arg  
130 135 140

Glu Val Thr Ile Tyr Gly Phe Arg Asp His Cys Met Glu Thr Ser Gly  
145 150 155 160

Gly Lys Val Trp Val Gly Thr Cys Val Ser Gly Lys Gln Asn Gln Arg  
165 170 175

Trp Ala Leu Tyr Gly Asp Gly Ser Ile Arg Pro Lys Pro Tyr Gln Asp  
180 185 190

Gln Cys Leu Thr Ser Gln Gly Asp Ser Val Arg Ser Val Ile Asn Leu  
195 200 205

Phe Ser Cys Thr Ala Gly Ser Pro Arg Gln Arg Trp Val Phe Thr Asn  
210 215 220

Lys Gly Ala Ile Leu Asn Leu Lys Asn Arg Leu Ala Met Asp Val Ala  
225 230 235 240

Glu Ser Asn Pro Ser Leu Arg Arg Ile Ile Ile Phe Ser Val Thr Gly  
245 250 255

Asn Pro Asn Gln Met Trp Leu Pro Val Pro  
260 265

<210> 9

<211> 789

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 9

gacgatggta cctgcactgc ttccgaacct acggtgcgga ttgtgggtct aaatggcctg 60

tgcgtcgacg tccgaaatgg aaaattccac gatggaaatc cgatacagtt gtggccctgc 120

aagtccaaca ccgataggaa tcagctgtgg acgatcagaa gggatggaac cattcgatct 180

aatagcaagt gcttgaccac ctatggctat cgtgatggca tgtatgtaat gatctacaac 240

tgtaatcgg ccgtgcggga ggccactatt tggcaaata gggaaaatgg aaccatcgtt 300

aatccaagat ccagtctggt actgggagca gcatctggaa acagccgcac taggcttact 360

gtgcaaacac aggcttactc gttgggacag ggctggcttg ccagcaatga taccgccct 420

cgcgaggtaa ccatatacgg attccgtgac cttgcatgg aagctaatgg atcgagtgtg 480

tgggtggaga cttgtgtgag taacaagcag aacaaaaat gggotttgta cggggatggt 540

tctatacgcc ccaaacaaaa ccgaaaccaa tgcctcacct gccagaaaga ctccgtttca 600

accgtaatca atattgttag ctgcagcgca ggatcgtctg ggcagcgatg ggtgtttacc 660

aataaaggga ccattttgaa tttaaagaat gggttggta tggatgtggc gcaatcaaat 720

ccaagcctcc gccgaataat catctaccca gccaccggaa agcctaata aatgtggctt 780

cccgtgcc 789

<210> 10

<211> 263

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 10

Asp Asp Gly Thr Cys Thr Ala Ser Glu Pro Thr Val Arg Ile Val Gly  
1 5 10 15

Leu Asn Gly Leu Cys Val Asp Val Arg Asn Gly Lys Phe His Asp Gly  
20 25 30

Asn Pro Ile Gln Leu Trp Pro Cys Lys Ser Asn Thr Asp Arg Asn Gln  
35 40 45

Leu Trp Thr Ile Arg Arg Asp Gly Thr Ile Arg Ser Asn Ser Lys Cys  
50 55 60

Leu Thr Thr Tyr Gly Tyr Arg Asp Gly Met Tyr Val Met Ile Tyr Asn  
65 70 75 80

Cys Asn Thr Ala Val Arg Glu Ala Thr Ile Trp Gln Ile Trp Glu Asn  
85 90 95

Gly Thr Ile Val Asn Pro Arg Ser Ser Leu Val Leu Gly Ala Ala Ser  
100 105 110

Gly Asn Ser Arg Thr Arg Leu Thr Val Gln Thr Gln Ala Tyr Ser Leu  
115 120 125

Gly Gln Gly Trp Leu Ala Ser Asn Asp Thr Ala Pro Arg Glu Val Thr  
130 135 140

Ile Tyr Gly Phe Arg Asp Leu Cys Met Glu Ala Asn Gly Ser Ser Val  
145 150 155 160

Trp Val Glu Thr Cys Val Ser Asn Lys Gln Asn Gln Lys Trp Ala Leu  
165 170 175

Tyr Gly Asp Gly Ser Ile Arg Pro Lys Gln Asn Arg Asn Gln Cys Leu  
180 185 190

Thr Cys Gln Lys Asp Ser Val Ser Thr Val Ile Asn Ile Val Ser Cys  
195 200 205

Ser Ala Gly Ser Ser Gly Gln Arg Trp Val Phe Thr Asn Lys Gly Thr  
210 215 220

Ile Leu Asn Leu Lys Asn Gly Leu Val Met Asp Val Ala Gln Ser Asn  
225 230 235 240

Pro Ser Leu Arg Arg Ile Ile Ile Tyr Pro Ala Thr Gly Lys Pro Asn  
245 250 255

Gln Met Trp Leu Pro Val Pro  
260

<210> 11

<211> 789

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 11

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tgcgtcgacg tccgacatgg aaaattccac gatggaaatc cgatacagtt gtggccctgc 120

aagtccaaca ccgataggaa tcagctgtgg acgatcagaa gggatggaac cattcgatct 180

aatagcaagt gcttgaccac ctatggctat cgtgatggca tgtatgtcat gatctacaac 240

tgtaatacgg ccgtgcggga ggccactatt tggcaaatat gggaaaatgg aaccatcgtt 300

aatccaaaat ccagtctggt actgggagca gcatctggaa gcagccgcac tacgcttact 360

gtgcaaacac aggcttactc gttgggacag ggctggcttg ccagccatga tacagcccct 420

cgcgaggtaa ccatatacgg ttccgtgac ctttgcattg aagctaattg atcgagtgtg 480

tkggtggaga cttgtgtgag tcacaagcag aaccaaaaaat gggctttgta cggggatggt 540

tctatacgcc ccaaacaaaa ccgaaccaa tgcctcacct gccagaaaga ctccgtttca 600

accgtaatca atattgtag ctgcagcgca ggatcgtctg ggcagcgatg ggtgtttacc 660  
aataaaggga ccatttgaa ttaaagaat gggttgggcc tggatgtggc gcaatcaa 720  
ccaagcctcc gccgaataat catctacca gccaccggaa agcctaata aatgtggctt 780  
cccggtgcca 789

<210> 12  
<211> 263  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature  
<222> 161  
<223> Xaa = any amino acid

<400> 12

Asp Asp Gly Thr Cys Thr Pro Ser Glu Pro Thr Val Trp Ile Val Gly  
1 5 10 15

Leu Asn Gly Leu Cys Val Asp Val Arg His Gly Lys Phe His Asp Gly  
20 25 30

Asn Pro Ile Gln Leu Trp Pro Cys Lys Ser Asn Thr Asp Arg Asn Gln  
35 40 45

Leu Trp Thr Ile Arg Arg Asp Gly Thr Ile Arg Ser Asn Ser Lys Cys  
50 55 60

Leu Thr Thr Tyr Gly Tyr Arg Asp Gly Met Tyr Val Met Ile Tyr Asn  
65 70 75 80

Cys Asn Thr Ala Val Arg Glu Ala Thr Ile Trp Gln Ile Trp Glu Asn  
85 90 95

Gly Thr Ile Val Asn Pro Lys Ser Ser Leu Val Leu Gly Ala Ala Ser  
100 105 110

Gly Ser Ser Arg Thr Thr Leu Thr Val Gln Thr Gln Ala Tyr Ser Leu  
115 120 125

Gly Gln Gly Trp Leu Ala Ser His Asp Thr Ala Pro Arg Glu Val Thr  
130 135 140

Ile Tyr Gly Phe Arg Asp Leu Cys Met Glu Ala Asn Gly Ser Ser Val  
145 150 155 160

Xaa Val Glu Thr Cys Val Ser His Lys Gln Asn Gln Lys Trp Ala Leu  
165 170 175

Tyr Gly Asp Gly Ser Ile Arg Pro Lys Gln Asn Arg Asn Gln Cys Leu  
180 185 190

Thr Cys Gln Lys Asp Ser Val Ser Thr Val Ile Asn Ile Val Ser Cys  
195 200 205

Ser Ala Gly Ser Ser Gly Gln Arg Trp Val Phe Thr Asn Lys Gly Thr  
210 215 220

Ile Leu Asn Leu Lys Asn Gly Leu Val Leu Asp Val Ala Gln Ser Asn  
225 230 235 240

Pro Ser Leu Arg Arg Ile Ile Ile Tyr Pro Ala Thr Gly Lys Pro Asn  
245 250 255

Gln Met Trp Leu Pro Val Pro  
260

<210> 13  
<211> 357  
<212> DNA  
<213> Viscum album coloratum

<220>

<221> misc\_feature  
<222> 19, 57, 190, 331  
<223> "n" = any single nucleotide

<400> 13

gccagattca atcccatcnt gtggaggcct cgccggcaaa ttaacagtgg ggagtcntct 60

ccaccaaaaca tgtacatgct cgagctggag acgagttggg gtcgacaatc cacccaagtc 120

cagcagtcca aggatggcat ttttaatacc caaataagat tgcagatttc cgccggtaac 180  
tttgtgacgn tgagcaatgt tcgcgacgtg atctccagct tggcgatcat gttgttcgaa 240  
tgcagtggtc ggccattctc ctctctcgac cacccttcgc cgctgctcct aaggccgtc 300  
gtggatgcgg ccaacgatgt cacctgcact ntttccgaac ccaccgtgcg catcgta 357

<210> 14  
<211> 119  
<212> PRT  
<213> Viscum album coloratum

<220>  
<221> misc\_feature  
<222> 7, 64, 111  
<223> Xaa = any amino acid

<400> 14

Ala Arg Phe Asn Pro Ile Xaa Trp Arg Leu Arg Arg Gln Ile Asn Ser  
1 5 10 15

Gly Glu Ser Ser Pro Pro Asn Met Tyr Met Leu Glu Leu Glu Thr Ser  
20 25 30

Trp Gly Arg Gln Ser Thr Gln Val Gln Gln Ser Lys Asp Gly Ile Phe  
35 40 45

Asn Thr Gln Ile Arg Leu Gln Ile Ser Ala Gly Asn Phe Val Thr Xaa  
50 55 60

Ser Asn Val Arg Asp Val Ile Ser Ser Leu Ala Ile Met Leu Phe Glu  
65 70 75 80

Cys Ser Gly Arg Pro Phe Ser Ser Leu Asp His Pro Ser Pro Leu Leu  
85 90 95

Leu Arg Ser Val Val Asp Ala Ala Asn Asp Val Thr Cys Thr Xaa Ser  
100 105 110

Glu Pro Thr Val Arg Ile Val  
115

<210> 15  
<211> 522  
<212> DNA  
<213> Viscum album coloratum

<220>

<221> misc\_feature

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tcccttataa tctcattca gatgatctcc gaggccgga gattcaatcc catcttttgg 180  
agggtctgcc aatacattaa cagcggggag tcattcttc ccgacatgta catgctcgag 240  
ctggagacta gttggggcca acaatccacg caagtcacgc agtctacgga tggcgtttt 300  
aataacccat ttcggttggg tatatccacc ggtaacttcg tgacgttgag caatgttcgc 360  
gacgtgatcg ccagcttagc gatcatgttg ttgtatgta gggaccgacc atcttctcc 420  
gacgtgcgct attggccgct ggtcatagca cccgtcttgg aaaatagcgg cgccgtcgac 480  
gatgttacct gcactgcttc cgaaccacc gtgcgcatcg ta 522

<210> 16  
<211> 174  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 16

Tyr Thr Asp Leu Glu Arg Tyr Ala Gly His Arg Asp Gln Ile Pro Leu  
1 5 10 15



Gly Ile Glu Glu Leu Ile Gln Ser Val Ser Ala Leu Arg Tyr Pro Gly  
20 25 30

Gly Ser Thr Arg Ala Gln Ala Arg Ser Leu Ile Ile Leu Ile Gln Met  
35 40 45

Ile Ser Glu Ala Ala Arg Phe Asn Pro Ile Phe Trp Arg Ala Arg Gln  
50 55 60

Tyr Ile Asn Ser Gly Glu Ser Phe Leu Pro Asp Met Tyr Met Leu Glu  
65 70 75 80

Leu Glu Thr Ser Trp Gly Gln Gln Ser Thr Gln Val Gln Gln Ser Thr  
85 90 95

Asp Gly Val Phe Asn Asn Pro Phe Arg Leu Gly Ile Ser Thr Gly Asn  
100 105 110

Phe Val Thr Leu Ser Asn Val Arg Asp Val Ile Ala Ser Leu Ala Ile  
115 120 125

Met Leu Phe Val Cys Arg Asp Arg Pro Ser Ser Ser Asp Val Arg Tyr  
130 135 140

Trp Pro Leu Val Ile Arg Pro Val Leu Glu Asn Ser Gly Ala Val Asp  
145 150 155 160

Asp Val Thr Cys Thr Ala Ser Glu Pro Thr Val Arg Ile Val  
165 170

<210> 17

<211> 18

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

<222> 3, 6, 12, 16

<223> n = inosine

<400> 17

gtnacncatc anaacngg 18

<210> 18

<211> 19

<212> DNA

<213> Viscum album coloratum

<220>

<221> misc\_feature

<222> 3, 6, 13, 16

<223> n = inosine

<400> 18

acnatncgca cngtnggtc 19

<210> 19

<211> 29

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 19

Tyr Glu Arg Glu Lys Leu Arg Val Thr His Gln Thr Thr Gly Asp Gln  
1 5 10 15

Tyr Phe Lys Phe Ile Thr Leu Leu Ala Asp Gln His Ser  
20 25

<210> 20

<211> 28

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 20

Tyr Glu Arg Glu Lys Leu Arg Val Thr His Gln Thr Thr Gly Asp Glu  
1 5 10 15

Tyr Phe Arg Phe Ile Thr Leu Leu Ala Asp Thr Val  
20 25

<210> 21

<211> 30

<212> PRT

<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 21

Tyr Glu Arg Glu Lys Leu Arg Val Thr His Gln Thr Thr Gly Asp Glu  
1 5 10 15

Tyr Phe Arg Phe Ile Thr Leu Leu Ala Asp Thr Val Ser Ser  
20 25 30

<210> 22

<211> 13

<212> PRT

<213> Viscum album coloratum

<220>

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<222> 4

<223> Xaa = any amino acid

<400> 22

Asp Val Thr Xaa Thr Ala Ser Glu Pro Thr Val Arg Ile  
1 5 10

<210> 23

<211> 20

<212> PRT

<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 23

Asp Asp Val Thr Ser Ser Ala Ser Glu Pro Thr Val Arg Ile Val Gly  
1 5 10 15

Arg Asn Gly Met  
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<210> 24

<211> 10

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 24

Tyr Glu Arg Leu Lys Leu Tyr Val Thr His  
1 5 10

<210> 25

<211> 28

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 25

Tyr Glu Arg Leu Arg Leu Arg Val Thr His Gln Thr Thr Gly Asp Glu  
1 5 10 15

Tyr Phe Arg Phe Ile Thr Leu Leu Arg Asp Tyr Val  
20 25

<210> 26  
<211> 17  
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<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 26

His Gln Thr Thr Gly Asp Glu Tyr Phe Arg Phe Ile Thr Leu Leu Arg  
1 5 10 15

Asp

<210> 27  
<211> 26  
<212> PRT EMLA  
<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 27

Tyr Glu Arg Leu Lys Leu Tyr Val Thr His Gln Thr Thr Gly Glu Glu  
1 5 10 15

Tyr Phe Arg Phe Ile Thr Leu Leu Arg Asp  
20 25

<210> 28  
<211> 30  
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<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 28

Ile Phe Pro Lys Gln Tyr Pro Ile Ile Asn Phe Thr Thr Ala Gly Ala  
1 5 10 15

Thr Val Gln Ser Tyr Thr Asn Phe Ile Arg Ala Val Arg Gly  
20 25 30

<210> 29

<211> 26

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 29

Glu Asp Arg Pro Ile Lys Phe Ser Arg Glu Gly Ala Thr Ser Gln Ser  
1 5 10 15

Tyr Lys Gln Phe Ile Glu Ala Leu Arg Glu

<210> 30

<211> 2

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 30

Tyr Val  
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<210> 31

<211> 29

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 31

Tyr Val Ser Ser Gly Ser Phe Ser Asn Glu Ile Pro Leu Leu Arg Gln  
1 5 10 15

Ser Thr Ile Pro Val Ser Asp Ala Gln Arg Phe Val Leu  
20 25

<210> 32

<211> 29

<212> PRT

<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 32

Tyr Val Ser Ser Gly Ser Pro Ser Asn Glu Ile Pro Leu Leu Arg Gln  
1 5 10 15

Ser Thr Ile Pro Val Ser Asp Ala Gln Arg Phe Val Leu  
20 25

<210> 33

<211> 29

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 33

Arg Leu Thr Thr Gly Ala Asp Val Arg His Glu Ile Pro Val Leu Pro

1 5 10 15

Asn Arg Val Gly Leu Pro Ile Asn Gln Arg Phe Ile Leu  
20 25

<210> 34

<211> 27

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 34

Arg Leu Arg Gly Gly Leu Ile His Asp Ile Pro Val Leu Pro Asp Pro  
1 5 10 15

Thr Thr Leu Gln Glu Arg Leu Arg Tyr Ile Thr  
20 25

<210> 35

<211> 29

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 35

Val Glu Leu Thr Asn Gln Gly Gly Asp Ser Ile Thr Ala Ala Ile Asp  
1 5 10 15

Val Thr Asn Leu Tyr Val Val Ala Tyr Gln Ala Gly Asp  
20 25

<210> 36



<211> 29  
<212> PRT  
<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 36

Val Glu Leu Thr Asn Gln Gly Gln Asp Ser Val Thr Thr Ala Ile Asp  
1 5 10 15

Val Thr Asn Ala Tyr Val Val Ala Tyr Gln Ala Gly Asp  
20 25

<210> 37  
<211> 29  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 37

Val Glu Leu Ser Asn His Ala Glu Leu Ser Val Thr Leu Ala Leu Asp  
1 5 10 15

Val Thr Asn Ala Tyr Val Val Gly Tyr Arg Ala Gly Asn  
20 25

<210> 38  
<211> 29  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 38

Val Glu Leu Ser Asn Ser Asp Thr Glu Ser Ile Glu Val Gly Ile Asp  
1 5 10 15

Val Thr Asn Ala Tyr Val Val Ala Tyr Arg Ala Gly Thr  
20 25

<210> 39

<211> 22

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 39

Gln Ser Tyr Phe Leu Arg Asp Ala Pro Asp Gly Ala Glu Arg His Leu  
1 5 10 15

Phe Thr Gly Thr Thr Arg  
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<210> 40

<211> 22

<212> PRT

<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 40

Gln Ser Tyr Phe Leu Arg Asp Ala Pro Arg Gly Ala Glu Thr His Leu  
1 5 10 15

Phe Thr Gly Thr Thr Arg  
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<210> 41

<211> 26

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 41

Ser Ala Tyr Phe Phe His Pro Asp Asn Gln Glu Asp Ala Glu Ala Ile  
1 5 10 15

Thr His Leu Phe Thr Asp Val Gln Asn Arg  
20 25

<210> 42

<211> 23

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 42

Gln Ser Tyr Phe Leu Arg Asp Ala Pro Ser Ser Ala Ser Asp Tyr Leu  
1 5 10 15

Phe Thr Gly Thr Asp Gln His  
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<210> 43

<211> 25

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 43

Ser Ser Leu Pro Phe Asn Gly Ser Tyr Pro Asp Leu Glu Arg Tyr Ala  
1 5 10 15

Gly His Arg Asp Gln Ile Pro Leu Gly  
20 25

<210> 44  
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<220>

<221> misc\_feature

<400> 44  
Ser Ser Leu Pro Phe Asn Gly Ser Tyr Pro Asp Leu Glu Arg Tyr Ala  
1 5 10 15  
Gly His Arg Asp Gln Ile Pro Leu Gly  
20 25

<210> 45  
<211> 28  
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<220>

<221> misc\_feature

<400> 45  
Tyr Phe Thr Ala Phe Gly Gly Asn Tyr Asp Arg Leu Glu Gln Leu Ala  
1 5 10 15  
Gly Asn Leu Arg Glu Asn Ile Glu Leu Gly Asn Gly  
20 25

<210> 46  
<211> 27  
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<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 46  
Ser Leu Pro Phe Tyr Gly Thr Tyr Gly Asp Leu Glu Arg Trp Ala His

1 5 10 15  
Gln Ser Arg Gln Gln Ile Pro Leu Gly Leu Asp  
20 25

<210> 47  
<211> 24  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 47  
Ile Glu Glu Leu Ile Gln Ser Val Ser Ala Leu Ile Tyr Pro Gly Gly  
1 5 10 15

Ser Thr Arg Ala Gln Ala Arg Ser  
20

<210> 48  
<211> 24  
<212> PRT  
<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 48  
Ile Arg Gln Leu Ile Gln Ser Val Thr Ala Leu Ile Phe Pro Gly Gly  
1 5 10 15

Ser Thr Arg Thr Gln Ala Arg Ser  
20

<210> 49  
<211> 25  
<212> PRT  
<213> Ricin toxin

<220>

<221> misc\_feature

<400> 49

Pro Leu Glu Glu Ala Ile Ser Ala Leu Tyr Tyr Tyr Ser Tyr Gly Gly  
1 5 10 15

Thr Gln Leu Pro Thr Leu Ala Arg Ser  
20 25

<210> 50

<211> 22

<212> PRT

<213> Arbin

<220>

<221> misc\_feature

<400> 50

Ala Leu Thr His Gly Thr Ser Phe Phe Arg Ser Gly Gly Asn Arg Asn  
1 5 10 15

Glu Glu Lys Ala Arg Thr  
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<210> 51

<211> 19

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<222> 7

<223> Xaa = any amino acid

<400> 51

Ala Arg Phe Asn Pro Ile Xaa Trp Arg Leu Arg Arg Gln Ile Asn Ser  
1 5 10 15

Gly Glu Ser

<210> 52  
<211> 30  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 52  
Leu Ile Ile Leu Ile Gln Met Ile Ser Glu Ala Ala Arg Phe Asn Pro  
1 5 10 15

Ile Phe Trp Arg Ala Arg Gln Tyr Ile Asn Ser Gly Glu Ser  
20 25 30

<210> 53  
<211> 30  
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<220>

<221> misc\_feature

<400> 53  
Ile Leu Ile Leu Ile Gln Met Ile Ser Glu Ala Ala Arg Phe Asn Pro  
1 5 10 15

Ile Leu Trp Arg Tyr Arg Gln Tyr Ile Asn Ser Gly Ala Ser  
20 25 30

<210> 54  
<211> 30  
<212> PRT  
<213> Rixin toxin

<220>

<221> misc\_feature

<400> 54

PHE ILE ILE CYS ILE GLN MET ILE SER GLU ALA ALA ARG PHE GLN

5 10 15

TYR ILE GLU GLY GLU MET ARG THR ARG ILE ARG TYR ASN ARG ARG

20 25 30

<210> 55

<211> 30

<212> PRT

<213> Abrin

<220>

<221> misc\_feature

<400> 55

LEU ILE VAL ILE ILE GLN MET VAL ALA GLU ALA ALA ARG PHE ARG

5 10 15

TYR ILE SER ASN ARG VAL ARG VAL SER ILE GLN THR GLY THR ALA

20 25 30

<210> 56

<211> 29

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 56

SER SER PRO PRO ASN TYR MET LEU GLU LEU GLU THR SER TRP GLY

5 10 15

ARG GLN SER THR GLN VAL GLN GLN SER LYS ASP GLY ILE PHE

20 25



<210> 57  
<211> 29  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 57  
PHE LEU PRO ASP MET TYR MET LEU GLU LEU GLU THR SER TRP GLY  
5 10 15  
GLN GLN SER THR GLN VAL GLN GLN SER THR ASP GLY VAL PHE  
20 25

<210> 58  
<211> 29  
<212> PRT  
<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 58  
PHE LEU PRO ASP VAL TYR MET LEU GLU LEU GLU THR SER TRP GLY  
5 10 15  
GLN GLN SER THR GLN VAL GLN HIS SER THR ASP GLY VAL PHE  
20 25

<210> 59  
<211> 29  
<212> PRT  
<213> Risin toxin

<220>

<221> misc\_feature

<400> 59  
SER ALA PRO ASP PRO SER VAL ILE THR LEU GLU ASN SER TRP GLY  
5 10 15  
ARG LEU SER THR ALA ILE GLN GLU SER ASN GLN GLY ALA PHE  
20 25

<210> 60  
<211> 29  
<212> PRT  
<213> Arbin

<220>

<221> misc\_feature

<400> 60  
PHE GLN PRO ASP ALA ALA MET ILE SER LEU GLU ASN MET TRP ASP  
5 10 15  
ASN LEU SER ARG GLY VAL GLN GLU SER VAL GLN ASP THR PHE  
20 25

<210> 61  
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<212> PRT  
<213> Viscum album coloratum

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<222> 17  
<223> Xaa = any amino acid

<400> 61  
ASN THR GLN ILE ARG LEU GLN ILE SER ALA GLY MET PHE VAL THR  
5 10 15  
SER Xaa ASN VAL ARG ASP VAL ILE SER  
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<210> 62  
<211> 24  
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<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 62  
ASN ASN PRO PHE ARG LEU GLY ILE SER THR GLY MET PHE VAL THR  
5 10 15  
LEU SER ASN VAL ARG ASP VAL ILE ALA

20

<210> 63

<211> 24

<212> PRT

<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 63

ASN ASN PHE ILE ARG LEU ALA ILE PHE PHE GLY MET PHE VAL THR  
5 10 15  
LEU THR ASN VAL ARG ASP VAL ILE ALA  
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<210> 64

<211> 24

<212> PRT

<213> Risin toxin

<220>

<221> misc\_feature

<400> 64

ALA SER PRO ILE GLN LEU GLN ARG ARG ASN GLY SER LYS PHE SER  
5 10 15  
VAL TYR ASP VAL SER ILE LEU ILE PRO  
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<210> 65

<211> 25

<212> PRT

<213> Abrin

<220>

<221> misc\_feature

<400> 65

PHE ASN GLN VAL THR LEU THR ASN ILE ARG ASN GLU PRO VAL ILE  
5 10 15  
VAL ASP SER LEU SER HIS PRO THR VAL ALA

20

25

<210> 66

<211> 16

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 66

SER LEU ALA ILE MET LEU PHE GLU CYS SER GLY ARG PRO PHE SER

5

10

15

SER

<210> 67

<211> 16

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 67

SER LEU ALA ILE MET LEU PHE VAL CYS ARG ASP ARG PHE SER SER

5

10

15

SER

<210> 68

<211> 16

<212> PRT

<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 68

SER LEU ALA ILE MET LEU PHE VAL CYS GLY GLU ARG PHE SER SER

5

10

15

SER

<210> 69

<211> 17  
<212> PRT  
<213> Risin toxin

<220>

<221> misc\_feature

<400> 69  
ILE ILE ALA LEU MET VAL TYR ARG CYS ALA PHE PHE PHE SER SER  
5 10 15  
GLN PHE

<210> 70  
<211> 15  
<212> PRT  
<213> Abrin

<220>

<221> misc\_feature

<400> 70  
VAL LEU ALA LEU MET LEU PHE VAL CYS ASN PRO PRO PRO PRO ASN  
5 10 15

<210> 71  
<211> 17  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 71  
LEU ASP HIS PRO SER PRO LEU LEU LEU ARG SER VAL VAL ASP ALA  
5 10 15  
ALA ASN

<210> 72  
<211> 19  
<212> PRT  
<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 72

ASP VAL ARG TYR TRP PRO LEU VAL ILE ARG PRO VAL LEU GLU ASN  
5 10 15  
SER GLY ALA VAL

<210> 73

<211> 12

<212> PRT

<213> Risin toxin

<220>

<221> misc\_feature

<400> 73

SER LEU LEU ILE ARG PRO VAL VAL PRO ASN PHE ASN  
5 10

<210> 74

<211> 10

<212> PRT

<213> Abrin

<220>

<221> misc\_feature

<400> 74

ALA ASN GLN SER PRO LEU LEU ILE ARG SER  
5 10

<210> 75

<211> 13

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 75

ASP VAL THR CYS THR ALA SER GLU CYS THR VAL ARG ILE

5 10

<210> 76

<211> 14

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<222> 4, 6

<223> Xaa = any amino acid

<400> 76

ASP VAL THR Xaa THR Xaa SER GLU PRO THR VAL ARG ILE VAL

5 10

<210> 77

<211> 15

<212> PRT

<213> Viscum album coloratum

<220>

<221> misc\_feature

<400> 77

ASP ASP VAL THR CYS THR ALA SER GLU PRO THR VAL ARG ILE VAL

5 10 15

<210> 78

<211> 20

<212> PRT

<213> Viscum album loranthacea

<220>

<221> misc\_feature

<400> 78

ASP ASP VAL THR SER SER ALA SER GLU PRO THR VAL ARG ILE VAL

5 10 15

GLY ARG ASN GLY MET

20

<210> 79  
<211> 19  
<212> PRT  
<213> Rizin toxin

<220>

<221> misc\_feature

<400> 79

ALA ASP VAL CYS MET ASP PRO GLU PRO ILE VAL ARG ILE VAL GLY  
5 10 15  
ARG ASN GLY MET

<210> 80  
<211> 20  
<212> PRT  
<213> Abrin

<220>

<221> misc\_feature

<400> 80

SER LYS ILE CYS SER SER ARG TYR GLU PRO THR VAL ARG ILE GLY  
5 10 15  
GLY ARG ASP GLY MET  
20